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Localized Pulmonary Cryptococcosis Diagnosed by Fine Needle Aspiration Cytology

- Report of a Case -

Chan Kum Park, M.D., Wan Sup Kim, M.D., Geun Shin Lyu, M.D.,
Seok Chol Jeon*, M.D., and Jung Dal, Lee, M.D.

*Departments of Pathology and Radiology**,
College of Medicine, Hanyang University, Seoul, 133-791, Korea

Initial rapid diagnosis of primary pulmonary cryptococcosis(PPC) occurring in a immunocompetent host was made by transthoracic fine needle aspiration cytology of a solitary subpleural nodule.

Numerous refractile spherical organisms surrounded by a clear halo were demonstrated with haematoxylin-eosin and Papanicolaou stains. The organisms, 5~15 μm in diameter, were easily demonstrated with Gomori methenamine-silver stain. Many of the organisms showed narrow-base budding. Carminophilic cell walls were well demonstrated with mucicarmine stain.

Key words: Cryptococcosis, Lung, Aspiration cytology

Introduction

Cryptococcus neoformans is a ubiquitous encapsulated yeast present in soil[1].

The usual route of infection is through the respiratory route[1]. About 90% of primary pulmonary cryptococcosis(PPC) confined to the lung occur in nonimmunosuppressed patients in contrast to disseminated cryptococcosis which is a major cause of death in AIDS patients[2,3]. Preoperative diagnosis of PPC is difficult because symptoms and radiological findings are nonspecific[2]. Sputum cytology as well as laboratory tests such as skin tests, serologic tests, and sputum culture reveal low level of accuracy, especially in pleura-based localized lesions[3,4].

Recently, several authors reported the importance of fine needle aspiration biopsy cytology (FNABC) in the preoperative diagnosis of cryptococcosis in the lung[5,6], lymph node[7], adrenal[8], and thyroid[9]. In this paper we report a case of localized pulmonary cryptcccoccosis diagnosed with FNABC, in whom diagnostic thoracotomy was avoided.

Case presentation

A 50-year-old man was admitted with fever and chest discomfort for two weeks. The chest

roentgenogram and computed tomographic scan revealed a solitary well-circumscribed 1cm sized mass in the left lower lung field of the subpleural region. Laboratory data including CBC, urinalysis, and liver function tests were all within normal limits with no evidence of abnormal cell-mediated immunity(Fig. 1, Fig. 2). No evidence of extrapulmonary involvement was present. Percutaneous transthoracic FNABC was performed under ultrasound guidance. Based on the Gomori-methenamine(GMS) and mucicarmine stain after routine Papanicolaou and haematoxylin and eosin (H & E) stain, rapid initial diagnosis of cryptococcosis was made. Sputum cytology failed to reveal the organisms. Sputum culture was negative. The mass lesion disappeared after antifungal treatment.

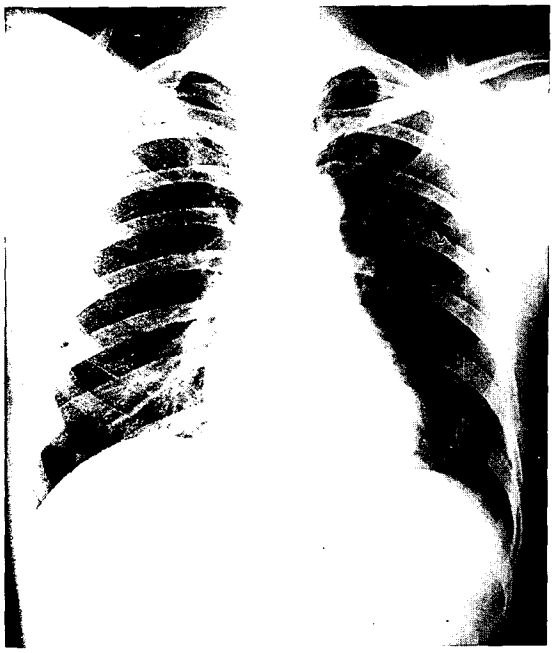

Fig. 1. Radiograph of the chest showing a coin sized localized lesion in left upper lung field(arrow).

1. Cytologic features

Examination with routinely stained Papanicolaou and H & E stained slides revealed single or multiple clusters of spherical, encapsulated organisms in an inflammatory fibrinous background (Fig. 3). Each cluster consisted of up to 10

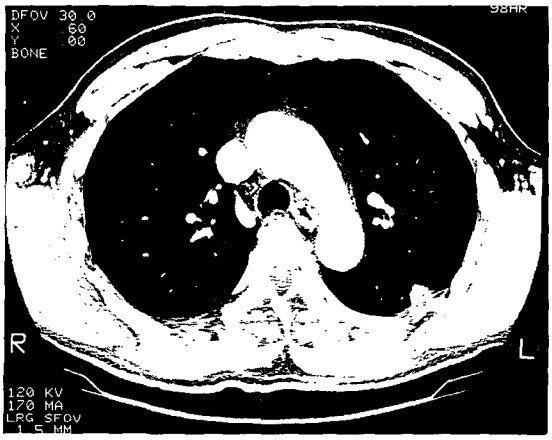

Fig. 2. Computed tomographic scan of the lung showing an about 1cm-sized subpleural nodule in left lower lung field(arrow).

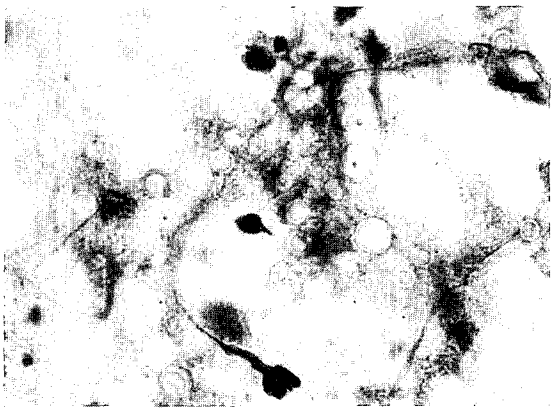

Fig. 3. Aspiration smear of subpleural nodule showing numerous round clear empty spaces containing refractile oranisms surrounded by halo(H-E, ×1000).

yeast-form organisms. The inflammatory cells in the background were composed of neutrophils, lymphocytes, and macrophages. Aggregates of epithelioid cells and rare multinucleated giant cells were also noted. The size of the organisms were variable, ranging from 5 to 15 μm in diameter. Most organisms were found extracellularly, although some of the organisms were present within the cytoplasm of macrophages and of multinucleated giant cells(Fig. 4). Necrosis was not conspicuous. The organisms had doubly refractile cell walls and refractile cytoplasmic inclusions surrounded by a distinctly outlined capsule. The capsule did not stain with routine stains, and appeared as a clear space. Under the impression of cryptococcosis, the cover glasses were removed and the slides were restained with GMS and mucicarmine. Many narrow-based, budding organisms were clearly recognized after GMS stain (Fig. 5). Pseudohyphaes were not found. Careful searching of the slides with mucicarmine stain revealed a few definitely carminophilic mucopolysaccharide capsule of the C. neoformans. Most of of the organisms showed diminished carminophilia.

Discussion

Primary cryptococcosis is thought to occur in the lungs, but demonstrable pulmonary cryptococcosis is rare[1]. The correct diagnosis of PPC is very important in view of the potential spontaneous resolution of this disease[6]. However, PPC patients are rarely recognized at presentation until a tissue diagnosis is obtained or positive laboratory data is present. It can be treated as pneumonia, tuberculosis, lung tumors, or many other diagnostic options until the diagnosis is made[6,10]. The manifestations of PPC is either subpleural nodules or pulmonary infiltrates[6]. Cytology is an important tool in the diagnosis of cryptococcosis[5-9]. In PPC patients with pneumonic infiltration, sputum cytology is a simple, noninvasive and reliable laboratory procedure[11,12]. But, as shown in this case, percutaneous transthoracic

Fig. 4. Aspiration smear also shows a few giant cells containin microorganisms in the cytoplasm(H-E, A: ×200, B: ×1000).

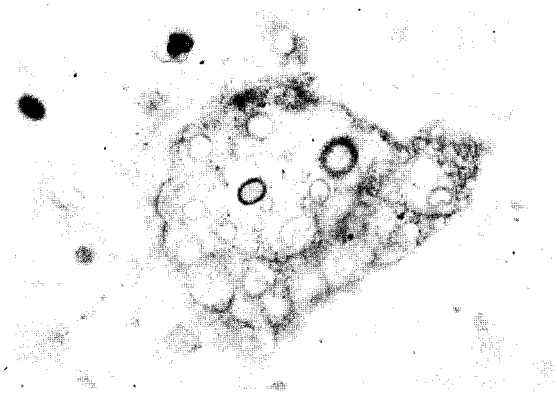

Fig. 5. Numerous fungal organisms with narrowbased buddin are clearly recognized(Gomori methenamine silver ×400, inset: ×1000).

Table 1. Differential diagnosis of yeast form organisms

	Cryptococcus neoformans	Histoplasma capsulatum	Blastomyces dermatitidis	Paracoccidioides brasiliensis	Coccidioides immitis
Organism	Yeastlike	Yeastlike	Yeastlike	Yeastlike	Spherule
Size(㎛)	5~15	2~4	8~15	10~200	10~30
Morphology	Thick capsule, carminophilic cell wall	Intracellular cluster	Mutlnucleate		Endospore
Reproduction	Single or multiple narrow based budding	Rare hour-glass typed budding	Single broad based budding	Multiple buds (ship's wheel)	No budding

FNABC under ultrasound guidance is a safe, simple and reliable procedure in the initial diagnosis of subpleurally located nodular lesions of PPC. However, screeners sometimes fail to detect doubly refractile microorganisms with Papanicolaou and H & E stain. In this case, C. neoformans was suspected from the numerous extracellular and occasional intracytoplasmic spherical yeast forms showing clear halo around refractile organisms. Thereafter, the diagnosis was readily confirmed by GMS stain. After careful searching, a few definitely carminophilic thick cell wall was demonstrated with mucicarmine stain. The differential diagnosis of yeast forms in tissue includes Blastomyces dermatitidis, Coccidioides immitis, Paracoccidioides brasiliensis and Histoplasma capsulatum(Table 1)[1,7]. In conclusion, FNABC is an effective, reliable and cost effective method for the evaluation of pleural based nodular lesions of PPC occurring in immunocompetent host.

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= 국문요약 =

세침흡인도말로 진단된 국한성 폐장효모균증

한양대학교 의과대학 병리학 교실 및 방사선과학 교실*

박 찬 금 · 류 근 신 · 김 완 섭 · 전 석 철* · 이 중 달

저자들은 최근 면역기능이 저하되지 않은 50세 남자환자의 폐장에 국한되어 발생한 효모균증을 세침흡인 도말소견으로 진단하고 이의 세포도말 소견을 보고하는 바이다.

세침흡인 도말배경내에는 녹색 내지는 염색되지 않으며 굴절되어 보이는 다양한 크기의 둥글거나 난원형이면서 그 주변에 투명한 운륜을 갖는 균체가 다수 산재되어 관찰되었다. 균체의 크기는 5~15 μm이었으며 Gomori methenamine-silver 염색상 발아성 홀씨가 잘 관찰되었다. Mucicarmine 염색상 피막은 연분홍색으로 염색되었다.